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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/735,638	12/16/2003	Cheng Siew Tay	P-6121-US	3526

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EXAMINER

NGUYEN, HUNG THANH

ART UNIT	PAPER NUMBER
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2841

DATE MAILED: 09/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/735,638	Applicant(s) TAY ET AL.	
	Examiner HUNG T. NGUYEN	Art Unit 2841	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) 21-38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

**DETAILED ACTION*****Claim Rejections - 35 USC § 102***

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3, 4, 6- 8, 10- 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Geng et al. (US 6,833,615).

Regarding claim 1: Geng et al. discloses in figures 4-5, a printed circuit board comprising: pads (104) suitable to be soldered to respective solder-balls of a device, where a perimeter of a pad (104) has a crack initiation point at a location where cracks in a solder-ball are anticipated to start after said solder-ball is soldered (it appears crack initiation point anticipated after solder-ball is soldered, see figures) to said pad (104), and where said pad (104) merges with a trace (see column 4, not shown in figures) along a portion of said perimeter that does not include a vicinity of said crack initiation point wherein said portion is not longer than the length of one quarter of said perimeter (it appears in figures 4-5 that portion is not longer than one quarter of perimeter).

Regarding claim 3, 10: Geng et al. discloses in figures 4-5, at least one of said pads is a solder-mask-defined pad (102).

Regarding claim 4, 11: Geng et al. discloses figures 4-5, at least one of said pads is substantially round (it appears pads are rounded, see figures).

Regarding claim 6: Geng et al. discloses in figure 4-5, the pad is substantially round (explain above) and a tangent to said perimeter at a middle point of said portion is substantially parallel to

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a crack propagation direction for said solder-ball (it appears pad is tangent to the perimeter at a middle point, see figures).

Regarding claim 7, 13: Geng et al. discloses in figures 4-5, a straight line joining said crack initiation point and a middle point of said portion is parallel to a crack propagation direction for said solder-ball (see figures).

Regarding claim 8: Geng et al. discloses in figures 4-5, a printed circuit board comprising: pads (104) suitable to be soldered to respective solder-balls of a device, said pads (104) having microvias (115) located therein, where a center of a microvia (the center of element 115) of a pad (104) is farther than a center of said pad (it shows in figures 4-5 that via is farther than a center of the pad) from a crack initiation point located on a perimeter of said pad (104) at a location where cracks in a solder-ball are anticipated to start after said solder-ball is soldered to said pad (it appears crack initiation point anticipated after solder-ball is soldered, see figures).

Regard claim 12, 14: Geng et al. discloses in figures 4-5, at least one point of the perimeter of said microvia (explain above) is located on the perimeter of said pad (element 115 is located on the perimeter of pad, see figures).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 2, 9, 16, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Geng et al. (US 6,833,615) in view of Asai et al. (US 6,831,234).

Regarding claim 2, 9, 16, 19: Geng et al. disclose all elements as described above with respect to claim 1 except, Geng et al. does not disclose at least one of said pads is a metal defined pad.

Asai et al. discloses at least one of said pads is a metal defined pad (see column 6, lines 58-65).

Geng and Asai et al. are analogous art because they are from the same field of endeavor to make PCB.

Therefore, it would have been obvious for one ordinary skill in the art at the time of the invention to make pad of Geng et al. to have metal as taught by Asai for the benefit of conductivity.

Claims 15, 17, 18, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Geng et al. (US 6,833,615) and further in view of Barton (US 6,724,194).

Regarding claim 15, 18: Geng et al. discloses in figures 4-5, the pads (104) soldered to respective solder-balls of said device, said pads (104) having microvias (115) located therein, where a center of a microvia (115) of a pad (104) is farther (it shows in figures 4-5 that via is farther than a center of the pad) than a center of said pad from a crack initiation point located on a perimeter of said pad at a location where cracks in a solder-ball are anticipated to start after said solder- ball is soldered to said pad (104).

Geng et al. does not disclose the printed circuit board has a voltage monitor installed thereon.

Barton discloses the printed circuit board has a voltage monitor (2) installed thereon.

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Geng et al. and Barton are analogous art because they are from the same field of endeavor to make circuit boards.

Therefore, it would have been obvious for one ordinary skill in the art at the time of the invention to make circuit board of Geng et al. to have a voltage monitor as taught by Barton for the benefit of detecting the fluctuation of voltages.

Regard claim 17, 20: Geng et al. discloses all element of the printed circuit board as described above with respect to claim 15 except, Geng et al. does not disclose the printed circuit board is a mother board.

However, it is old and well known for one ordinary skill in the art to have via, microvia on mother board

Therefore, it would have been obvious for one ordinary skill in the art at the time of the invention to make motherboard to have via and micro via for the benefit of assembly components.

Relevant Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The Yasue et al. (US 6,010,768) teaches the multilayer of printed circuit board, Inagaki et al. (US 6,724,638) teaches the printed circuit board, Wang et al. teaches the technique of bonding layers, Shirai et al. (US 6,365,843) teaches the multi-layers with via, Enomoto et al. (US 5,589,255) teaches the adhesive plating for circuit board, Geng et al. (US 6,833,615) teaches the off line via, Barton (US 6,724,194) teaches the volt monitor. .

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Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUNG T. NGUYEN whose telephone number is 571-272-5983. The examiner can normally be reached on 8:00AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, KAMMIE CUNEO can be reached on 571-272-1957. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

HN

HUNG NGUYEN

9/6/06


DEAN A. REICHARD
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800 9/18/06